

embodiment of the present invention, the pressure processing a sample in the processing chamber is set to 0.5 to 4.0 Pa. By setting the gas pressure in the processing chamber 10 to a low pressure below 4.0 Pa, probability of ion collision in the sheath is decreased. Therefore, in processing a sample 40, directivity of ions is increased and accordingly it becomes possible to perform vertical fine pattern. However, in order to attain the same processing rate under a pressure below 0.5 Pa, the exhausting system and the high frequency electric power source become large in size, and dissociation of the processing gas occurs excessively due to increase of electron temperature, as a result, the processing characteristic is likely to be degraded.

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Please replace Paragraph 1, starting on line 8 with the following new paragraph:

In general, between a frequency of a plasma generating electric power source for a pair of electrodes and a minimum gas pressure capable of stably discharging, there is relationship that the lowest gas pressure for stable discharge is decreased as the frequency of the electric power source is increased and the distance between the electrodes is increased. In order to avoid ill effects such as attaching of deposits onto surrounding walls and onto the discharge confining ring 37 and to effectively perform a function of removing fluorine or oxygen by the upper electrode cover 30, the susceptible cover 39 and the resist in the sample, it is preferable that the distance between the electrodes is set to a value shorter than 50 mm which corresponds to a distance smaller than 25 times of mean-free-path at the maximum gas pressure of 40 mTorr. On the other hand, in order to attain stable discharge, the distance